

HUMAN RADIATION EXPERIMENTS

RECORDS PROVENANCE FORM

REPOSITORY NAME	INEL
COLLECTION NAME	SPECIAL POWER EXCURSION REACTOR TEST (SPERT)
BOX NUMBER	INEL BOX NO. 22305 FRC AGENCY BOX NO. 30 FRC NO. 150673 ACCESSION NO. 430 78 0073
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CROSS REFERENCES:

ITEMS OF INTEREST:

MAY 13 1964

Some Radiological Aspects of the SPERT I Destructive Test

April 14, 1964

Preliminary Report by the AEC Health and Safety Division

Several methods were used to evaluate the environmental hazards from the Destructive Test. The following is a brief summary of the results obtained.

An ionization chamber, 100 meters from the reactor vessel recorded a 150 mrem per hour peak due to the excursion. Radiation levels at 200 meters reached 15 mrem per hour due to passage of the cloud of airborne radioactivity. The aerial monitoring team followed this cloud and recorded radiation levels of 0.2 mrem per hour at the Spert fence and background levels at about 4000 meters. Evaluation of the film badge data indicated that the maximum beta and gamma doses delivered were 15.8 rem and 16.0 rem respectively.

Concentrations of airborne radioactivity appeared to be about twice as great as those resulting from the first oxide core destructive test. Gamma spectrometry of air samples confirmed the presence of daughters of Kr-91, Kr-92, and Xe-139.

From the various decay chains and fission yields from an excursion, it is apparent only noble gases were released in any significant amount. Approximately 2200 curies of noble gases were released to the atmosphere; this figure represents about 0.01 percent of the total fission product inventory for a 200 Mw-sec energy release.

As in the previous Spert I destructive tests, 20 liter polyethylene carboys, filled with tissue equivalent solution, were used as phantoms. Four phantoms, five feet from the vessel edge, were exposed to approximately 1.5 rem gamma and 2 rem beta. The front to back ratios of gamma and beta were 4 and 4.5 respectively. This was at the edge and 0.3 meters above the top, of the reactor vessel. The exposure 7.7 meters downwind was 50 mrem gamma and 200 mrem beta; at 15.5 meters, 20 mrem gamma and 100 mrem beta; and at 31 meters, 15 mrem gamma and 40 mrem beta.

An effort was made to measure the neutron energy spectrum (by the use of criticality dosimeters), but the neutron flux immediately adjacent to the reactor vessel was too low to permit a determination. The only activation products detected and positively identified in the dosimeters and samples which had been placed around the reactor were In-116 and Cu-64. No fission product from the fission foils were detected.

A sample of reactor water contained the usual fission products plus the activation product Np-239 (U-238 \rightarrow U-239 β^- Np-239). The water was analyzed for Ce-143, Mo-99, Zr-97, and total uranium. Based on the results of these analyses, it was estimated that 4×10^{19} fissions occurred during the excursion.

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COLLECTION SPERT
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Radiological aspects of
FOLDER Spert-I Destructive Test